

**STORMWATER TREATMENT AREA NO. 3 & 4**  
**PLAN FORMULATION**

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## **11. VEGETATION SURVEY & IMPACTS TO WETLANDS**

### **11.1 INTRODUCTION**

This section of the *Plan Formulation Document (PFD)* includes a summary of a vegetation survey of STA-3/4 and its surrounding area, performed in mid-1999 by Environmental Permitting & Design, Inc. (EPD). This summary includes the study area, scope, methodology, and results of the vegetation survey, as well as the anticipated impacts to wetlands resulting from construction of STA-3/4 and its associated works. The primary coverage areas for the vegetation survey included the northerly three miles of WCA-3A east of Structure G-206, the L-5 Borrow Canal, the proposed route of the Supply Canal, areas adjacent to existing pump stations, and the non-farmed areas (as of 1999) within STA-3/4. The surveyed areas are shown on Site Plans #1 and #2 (Figures 11.1 and 11.2) which are referred to extensively throughout this section, particularly when referring to the surveyed areas of WCA-3A and STA-3/4.

The general methodology of the vegetation survey included a qualitative field survey using transect techniques. These techniques included subdividing the surveyed tracts into transects (i.e. cells), visually observing the plant communities, and noting the dominant vegetation species within each community. The categorization of plant communities included both the predominant components and floristic (scattered) components.

### **11.2 WCA-3A**

#### **11.2.1 Scope**

EPD surveyed plant communities in an area 8.0 miles west of the L-5 Borrow Canal – U.S. 27 intersection and 3.0 miles south of the L-5 Borrow Canal as shown Figure 11.1. At some future date, operation of the proposed project will result in the discharge of considerable quantities of treated runoff directly to the western portion of WCA-3A. Plant communities in this area were delineated and described to allow evaluation of potential impacts to this area resulting from future direct discharges. The most common community types were Sawgrass Marsh with varying degrees of vigor, monodominant

*Insert Figure 11.1*

*Insert Figure 11.2*

Cattail, and mixed Cattail/Sawgrass Marsh. Fires in the spring of 1999 severely impacted woody components within WCA-3A, and as a result, fewer woody species were observed than likely would have existed prior to the fires.

### 11.2.2 Methods

One-quarter mile east-west transects were established paralleling L-5. These transects were surveyed (visual observations only) and dominant species were recorded at quarter-mile intervals. Thus, the vegetation was observed continuously and the results recorded each one-quarter mile. Emphasis was on vegetational dominance rather than floristic composition. Once the field observations were complete, communities with similar dominants were grouped to form community types.

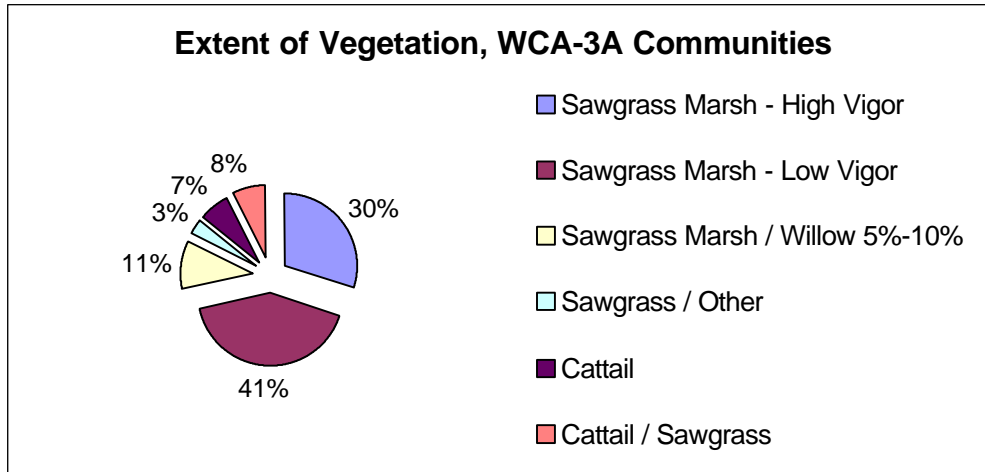
### 11.2.3 Vegetation Survey

A typical description of each identified community type and the overall percentage of each community are presented in Table 11.1 and shown on Figure 11.3. WCA-3A vegetation is composed of several plant communities, particularly Sawgrass, Willow and Cattail. The detailed descriptions of each of these communities are presented in Appendix I. The relative distribution of the various plant communities is shown in Figure 11.3.

Table 11.1  
WCA-3A (South of L-5) Vegetation Communities

Community	Extent (%)
Sawgrass Marsh - High Vigor	30.0
Sawgrass Marsh - Low Vigor	41.5
Sawgrass Marsh / Willow 5%-10%	10.7
Sawgrass Marsh / Willow 11%-20%	1.4
Sawgrass Marsh / Willow > 20%	0.3
Sawgrass / Arrowhead	1.7
Cattail	6.9
Cattail / Sawgrass	7.5

Figure 11.3



## 11.3 L-5 CANAL

### 11.3.1 Scope

EPD surveyed the plant communities from the southern toe of slope of the levee on the south side of the L-5 Borrow Canal to the northern toe of slope of the North L-5 Levee Road. Areas along L-5 were mapped in the event that construction of STA-3/4 and its associated works impacted wetland areas along L-5. Five habitat zones were identified and the plant communities mapped within each zone.

### 11.3.2 Methods

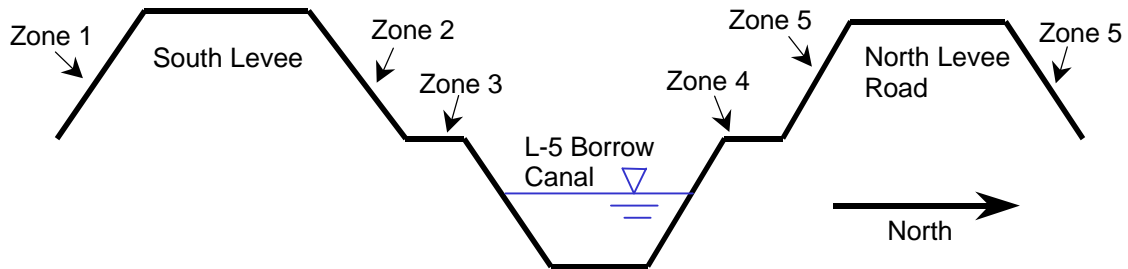
One-tenth mile east-west transects were established paralleling the L-5 for a total of 142 transect areas. These transects were visually surveyed on a continuous basis and dominant vegetation species within each zone were recorded. Once the field observations were complete, communities with similar dominants were grouped to form community types. The limits of the surveyed area are shown on Figures 11.1 and 11.2.

Five zones were identified within the L-5 study area (Table 11.2 and Figure 11.4).

Table 11.2  
Zonal Definition of L-5 Canal

Zone#	Location	Total Area (Acres)
One	South Slope of South L-5 Canal Levee Road	17
Two	North Slope of South L-5 Canal Levee Road	17
Three	South Bank of L-5 Canal to Toe of Levee	111
Four	North Bank of L-5 Canal to Toe of Levee	63
Five	North and South Slopes of North L-5 Canal Levee Road	17

Figure 11.4  
L-5 Canal Transect Area Zones



### 11.3.3 Vegetation Survey

The typical description of the community types within each zone and the overall percentage of each community are presented in Table 11.3. The detailed description of each of these communities is presented in Appendix I. Vegetation along L-5 is composed of several plant communities, particularly Brazilian Pepper in Zones 1 & 2, Wetland Herbaceous & Brazilian Pepper in Zone 3, Wetland Herbaceous and Sawgrass in Zone 4, and Ragweed in Zone 5. In addition, Baccharis is dominant in many parts of many zones. The distribution within the zones of these plant communities is shown in Figure 11.5.

Table 11.3  
Vegetation Coverage of L-5 Canal

Community Number	Community Description	Occurrence in Zones 1 & 2	Occurrence in Zone 3	Occurrence in Zone 4	Occurrence in Zone 5	% of Total Communities
2	Brazilian Pepper	96				16.9%
3	Burned Brazilian Pepper	30				5.3%
4	Wax Myrtle	3				0.5%
5	Brazilian Pepper / Wax Myrtle	3				0.5%
6	Brazilian Pepper / Baccharis	10				1.8%
7	Brake Fern		1			0.2%
8	Cutgrass / Willow		1			0.2%
9	Cutgrass / Wetland Herbaceous - Wet Phase		6	8		2.5%
10	Willow / Cutgrass		6	3		1.6%
11	Brazilian Pepper / Cattail		1			0.2%
12	Brazilian Pepper / Wetland Herbaceous - Wet Phase		3	1		0.7%
13	Cutgrass / Brazilian Pepper		1	1		0.4%
14	Wetland Herbaceous - Wet Phase / Willow		4			0.7%
15	Wetland Herbaceous - Wet Phase / Brazilian Pepper		19	2		3.7%
16	Brazilian Pepper / Woody		21	10		5.5%
17	Wetland Herbaceous - Dry Phase		6	16		3.9%
18	Wetland Herbaceous - Wet Phase		1	8		1.6%
19	Sawgrass / Wetland Herbaceous - Wet Phase		28	12		7.0%
20	Sawgrass / Baccharis		25	17		7.4%
21	Sawgrass / Brazilian Pepper		8	4		2.1%
22	Willow / Sawgrass		6	2		1.4%
23	Wetland Herbaceous - Dry Phase / Wax Myrtle		2			0.4%
24	Sawgrass / Wax Myrtle		3	16		3.3%
25	Peruvian Water Primrose / Cutgrass			1		0.2%
26	Cattail / Willow			1		0.2%
27	Cattail / Wetland Herbaceous Wet Phase			15		2.6%
28	Baccharis / Willow			1		0.2%
30	Baccharis / Brazilian Pepper			14	1	2.6%
31	Baccharis / Wax Myrtle			10		1.8%
32	Ragweed / Elephantgrass				4	0.7%
33	Ragweed / Beggar Tick				13	2.3%
34	Ragweed / Johnsongrass				55	9.7%
35	Ragweed / Castor Bean				7	1.2%
36	Johnsongrass				7	1.2%
37	Beggar Tick / Brake Fern				2	0.4%
38	Ragweed / Brazilian Pepper				28	4.9%
39	Ragweed				25	4.4%
						100.0%
	Community Totals	142	142	142	142	568

Figure 11.5

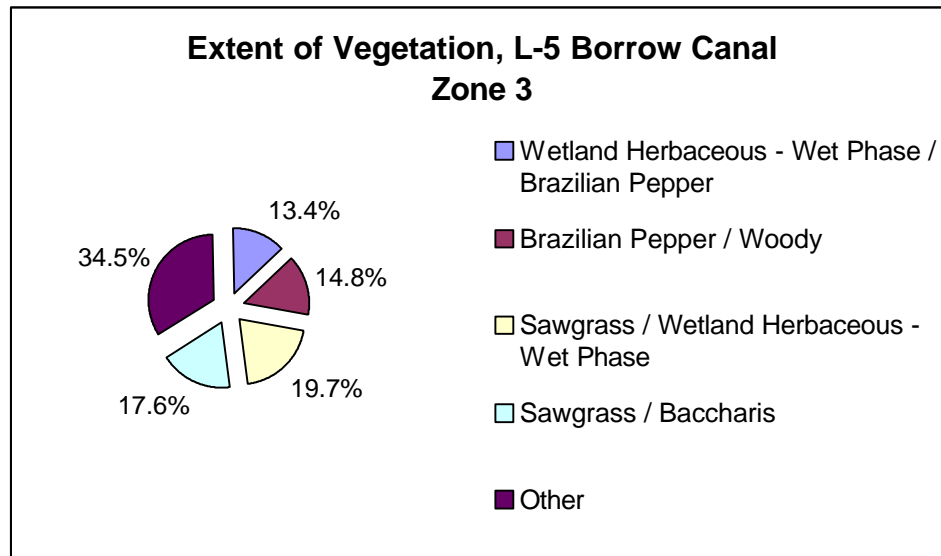
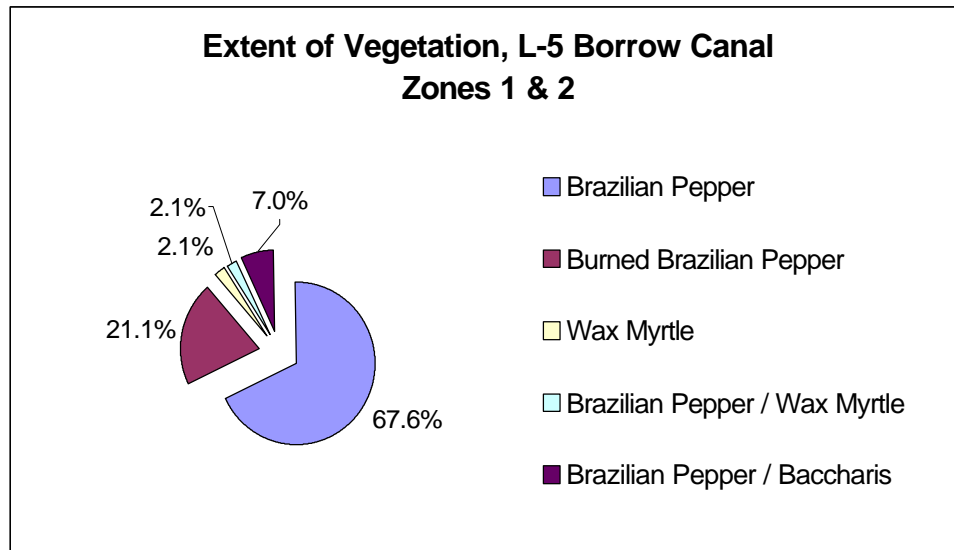
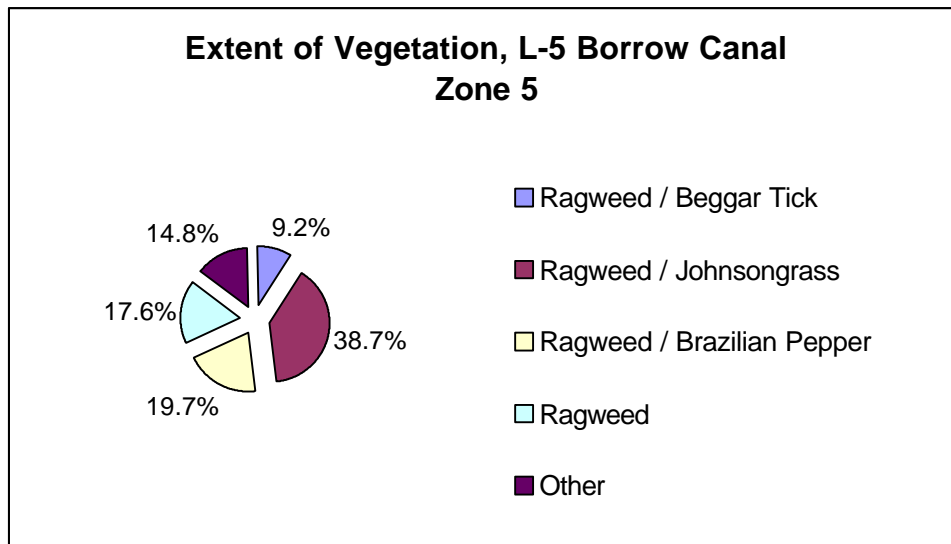
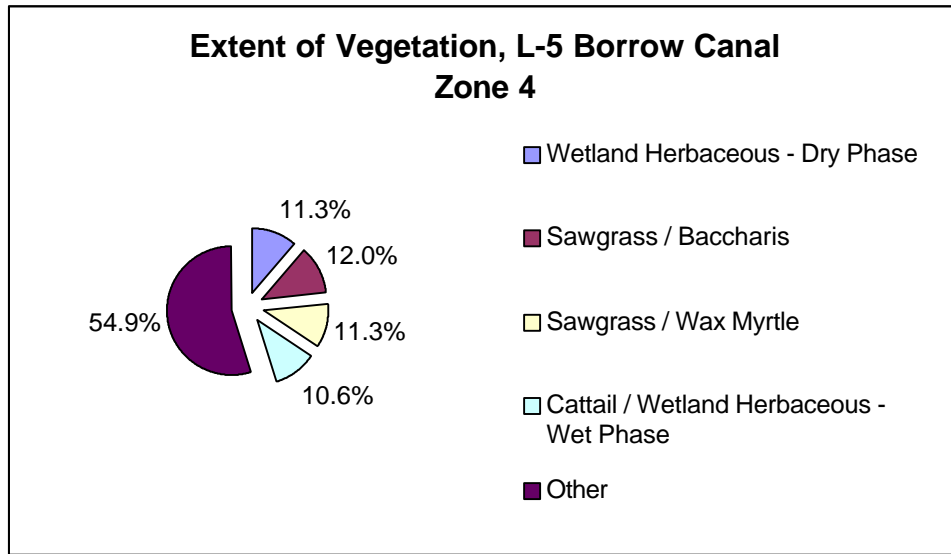


Figure 11.5 cont.



## 11.4 SUPPLY CANAL

### 11.4.1 Scope

EPD surveyed plant communities along the proposed route of the Supply Canal and along the western limits of STA-3/4 from the Miami Canal to L-5. The surveyed area followed the perimeter levee and canal system of the Holey Land as shown on Figures 11.1 and 11.2. Construction of the proposed project is anticipated to impact vegetated areas along the existing Holey Land Levee and Seepage Canal. Habitat zones were identified and the plant communities were mapped.

### 11.4.2 Methods

One-tenth mile east-west transects were established paralleling the levee in areas where vegetation was diverse. Along the northwestern portions of the levee, the transect distance was extended to one-quarter mile because of the lack of vegetative diversity. Five major zones were identified within the defined study area as shown in Table 11.4 and Figure 11.6. The distribution and size of these zones varied along the Supply Canal route.

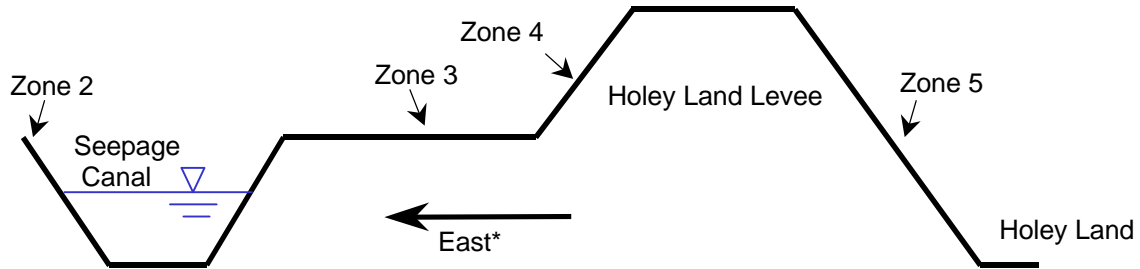
Table 11.4  
Zonal Definition of Supply Canal

Zone #	Zone Area Definition
One	Area between Boundary Canal Levee and North / East Inflow Control Mound
Two	North / East Slope of Seepage Canal
Three	Area from Seepage Canal to Toe of S/W Holey Land Levee
Four	Inside Slope of S/W Holey Land Levee
Five	Outside Slope of S/W Holey Land Levee

Figure 11.6

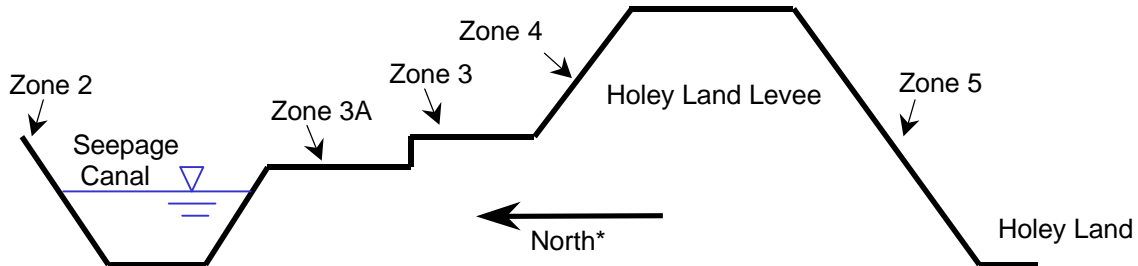
Supply Canal Transect Area Zones

Transects 3 - 22 and 44 - 77:



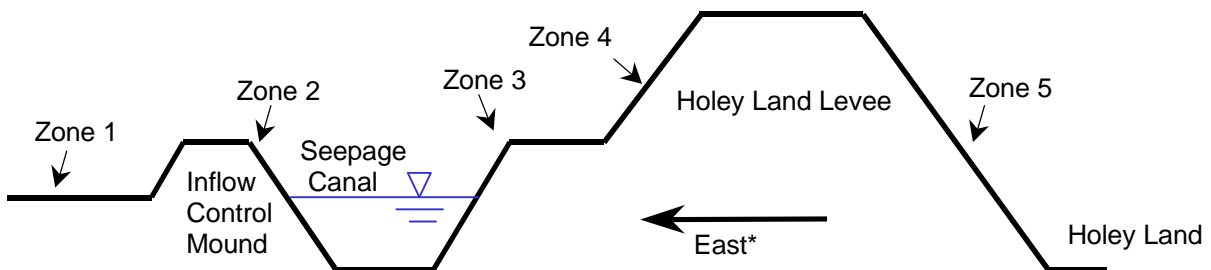
\*Transects 20-22, 44-55, 76 North

Transects 23 - 43:



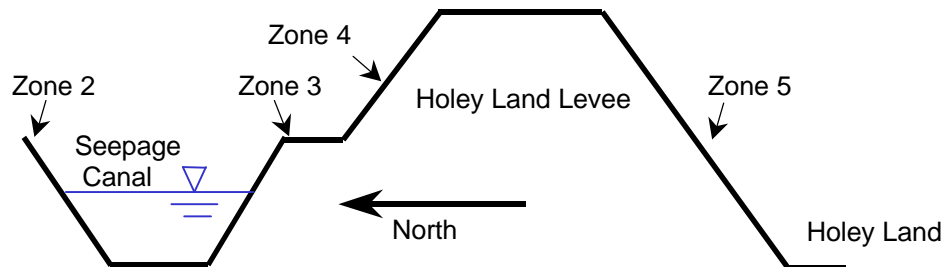
\*Transects 31-33 East

Transects 78 - 102:



\*Transects 100-102 North

Transects 103 - End:



Within each of these zones, the transects were visually surveyed and dominant species were recorded. Communities with similar dominants were grouped within each zone to form community types.

#### **11.4.3 Vegetation Survey**

The typical description of each community type within each zone and the overall percentage of each community are presented in Table 11.5. The detailed description of each of these communities is presented in Appendix I. Vegetation along the route of the Supply Canal and the west side of STA-3/4 is composed of several plant communities, particularly Brazilian Pepper in Zones 1 & 2, Baccharis and Wetland Herbaceous in Zone 3, Brake Fern in Zone 4, and Ragweed and Brake Fern in Zone 5. The distribution within the zones of these plant communities is shown in Figure 11.7.

Table 11.5  
Vegetation Coverage of Supply Canal

Community Number	Community Description	Occurrence in Zone 1	Occurrence in Zone 2	Occurrence in Zone 3A	Occurrence in Zone 3	Occurrence in Zone 4	Occurrence in Zone 5	% of Total Communities
1	Brazilian Pepper	6	31					7.3%
2	Mixed Shrub		2	1	2			1.0%
3	Brazilian Pepper / Fern		25		2	18		8.9%
4	Brazilian Pepper / Baccharis	1	9		2	1	12	4.9%
5	Cattail		2		1			0.6%
6	Baccharis / Brake Fern		3		17	14	1	6.9%
7	Brake Fern		2		4	39	12	11.2%
8	Ragweed / Potatootree				1		15	3.1%
9	Brazilian Pepper / Ragweed		1			2	1	0.8%
10	Brake Fern / Ragweed / Beggar Tick		4		1	10		3.0%
11	Brake Fern / Lantana		1			14	14	5.7%
12	Baccharis / Brake Fern		2		6	2	17	5.3%
13	Baccharis / Ragweed				1			0.2%
14	Wet Components / Sawgrass			4	2			1.2%
15	Baccharis / Marsh Fern				2			0.4%
16	Beggar Tick / Ragweed					5	17	4.3%
17	Brake Fern / Grass						1	0.2%
18	Wetland Herbaceous - Wet Phase / Woody			1	10			2.2%
19	Bluestem / Brake Fern						2	0.4%
20	Fern / Pluchea				4			0.8%
21	Brake Fern / Elephantgrass			3	2	2	3	2.0%
22	Mixed Wetland Herbaceous			4	29			6.5%
23	Brake Fern / Nettle tree					2		0.4%
24	Baccharis / Wax Myrtle			1				0.2%
25	Mixed Wetland Herbaceous / Woody			5	3			1.6%
26	Wetland Herbaceous - Dry Phase				10			2.0%
27	Wetland Herbaceous - Dry Phase / Baccharis				14			2.8%
28	Brazilian Pepper / Grass	3	12		1			3.1%
29	Lantana / Ragweed / Bidens		2			2	9	2.6%
30	Brazilian Pepper / Castor Bean		2				1	0.6%
31	Sawgrass / Willow							0.0%
32	Baccharis / Willow				1			0.2%
33	Potatootree / Brake Fern					3		0.6%
34	Elephantgrass	6	2					1.6%
35	Cattail		1					0.2%
36	Baccharis / Elderberry	5						1.0%
37	Brazilian Pepper / Elderberry	1						0.2%
38	Bidens / Ragweed / Grass		3				9	2.4%
39	Grass		10			2	2	2.8%
40	Baccharis / Grass		3					0.6%
41	Fern / Grass					1		0.2%
42	Leather Fern				1			0.2%
43	Lantana / Grass						1	0.2%
								100.0%
	Community Totals	22	117	19	116	117	117	508

Figure 11.7

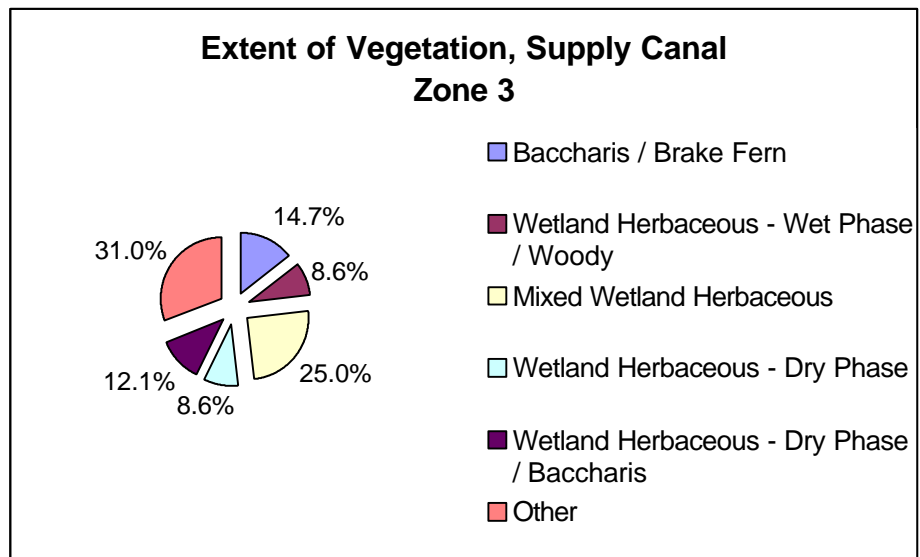
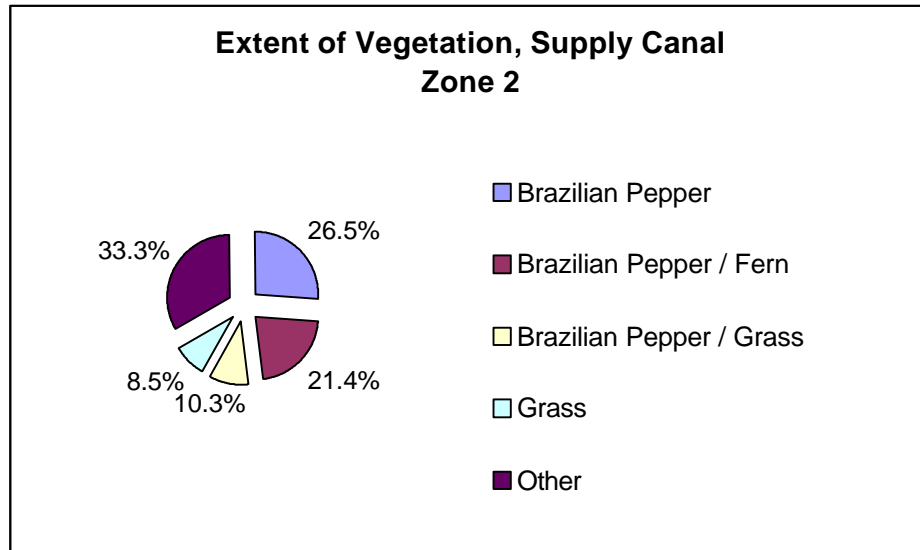
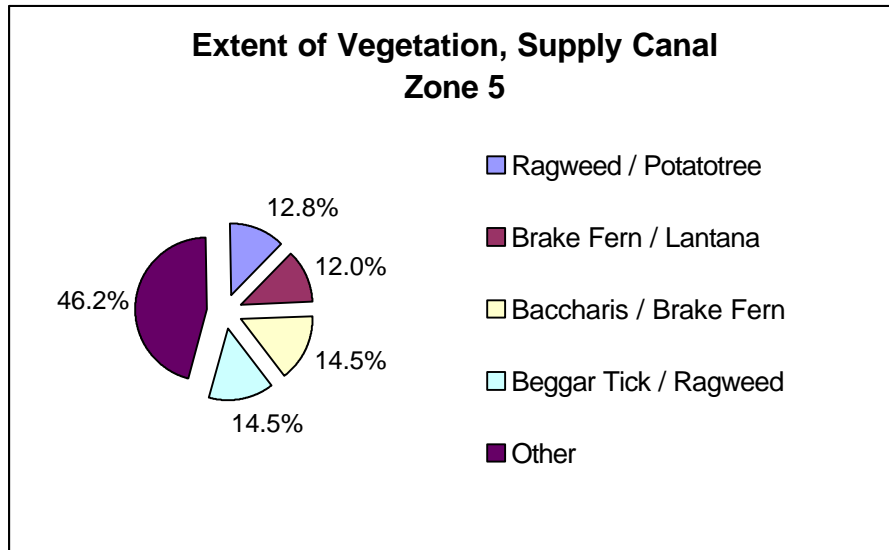
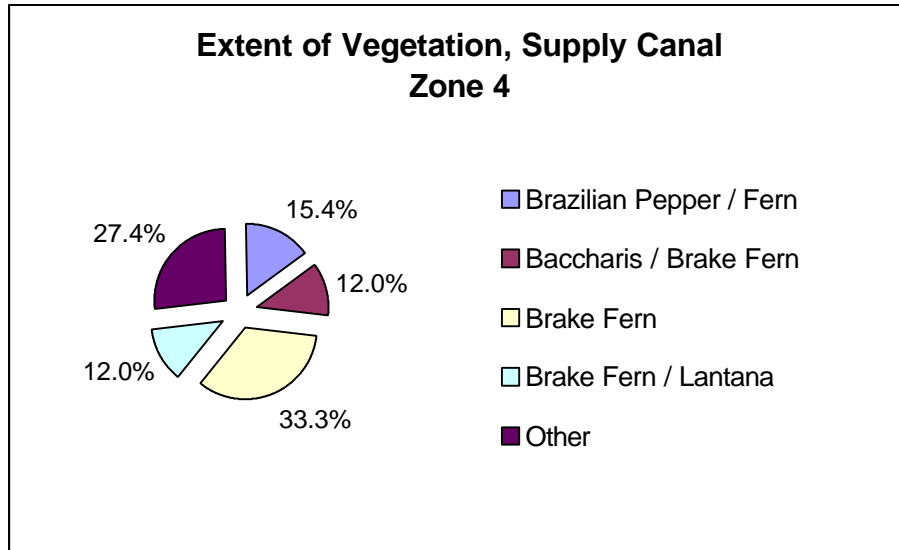


Figure 11.7 cont.



## 11.5 DISJUNCT AREAS

EPD surveyed the composition of three disjunct areas near existing pump stations as shown on Figure 11.2. The areas were determined in 1995 to be jurisdictional areas by the Florida Department of Environmental Protection; that determination was made in

connection with the development of the various General Design Memoranda for the Everglades Construction Project.

Disjunct area 1 is located near the existing Multi-Turf pump station as shown on Figure 11.8 and the jurisdictional areas consist of existing canals and a pump discharge basin. Vegetation in the discharge basin east of the pumping station is monodominant Water Lettuce (*Pistia stratiotes*). The coverage of Water Lettuce is so advanced that it is being colonized by Water Primrose (*Ludwigia sp.*) and Barnyard Grass (*Echinochloa crusgalli*). The canal west of the pumping station pond is characterized by water lettuce. The banks are vertical and water level fluctuations combined with absence of soil have combined to prevent vegetational colonization. The canal south of the pump station is characterized by monodominant water lettuce. Along the southern portions of this canal it has eutrophied to the point where Maidencane (*Panicum hemitomon*), Torpedograss (*Panicum repens*) and Goobergrass, (*Amphicarpum muhlenbergianum*) have colonized the area. The only upland vegetation in the area is Elephantgrass (*Pennisetum purpureum*), Brazilian Pepper and Guineagrass (*Panicum Maximum*). All these wetland areas are of limited habitat quality and impacts from their disturbance or removal are considered to be minimal.

Disjunct Area 2 consists of canals and the discharge basin for the Multi-Turf/Okeelanta Pump Station (located 1 mile north of Multi-Turf Pump Station) as shown on Figure 11.9. Vegetation in the discharge basin is also monodominant Water Lettuce. The canals flowing to or from this pump station are characterized by open water with occasional areas of Water Lettuce. Upland vegetation includes Giant Ragweed (*Ambrosia trifida*), Elderberry (*Sambucus canadensis*) and Johnsongrass (*Sorghum halapense*). All vegetation found at this site is of low quality. Disjunct Area 3 is located at the Supply and Miami Canal intersection as shown on Figure 11.10 and is characterized by relatively open water with occasional Water Hyacinth (*Eichhorina crassipes*). The smaller canals that parallel the Holey Land levees are characterized by monodominant Water Lettuce. Upland vegetation along the canals is primarily Brazilian Pepper. All these areas are of limited wildlife value.

Insert Figure 11.8 here

Insert Figure 11.9 here

Insert Figure 11.10 here

## **11.6 STA-3/4 EXOTICS**

EPD surveyed exotic plant communities within the footprint of STA-3/4 as shown on Figure 11.2. The distribution and extent of Brazilian Pepper and all other exotics that are likely to survive inundation if not removed were identified and placed into risk categories. The high-risk category can be described as areas where vegetation is likely to thrive following inundation. The majority of the high-risk areas are located in the southeast and southwest portions of the STA. These areas are typically dominated by mature Brazilian Pepper trees or mature Willow with a significant presence of Brazilian Pepper. The moderate risk category can be described as areas that are less likely to survive inundation. Vegetation within this category is located primarily in the central and western areas of the STA and are candidates for becoming high risk areas within three years of inundation. They are characterized by one or more of these attributes: moderate-size vigorous Willows and/or Brazilian Pepper; a combination of vigorous Willow and Peruvian Ludwigia; and scattered moderate-size Willow in a Cattail matrix. It is recommended that all exotics be removed from the interior of the STA prior to inundation.

## **11.7 ANTICIPATED IMPACTS TO WETLANDS**

Construction of STA-3/4 and its associated works will impact areas considered jurisdictional wetlands or waters by the Florida Department of Environmental Protection, and areas within WCA-3A adjacent to L-5 that may also be considered jurisdictional wetlands. The jurisdictional areas to be impacted consist of the disjunct areas near existing pumping stations described in previous sections. Impacts to potential wetlands in WCA-3A will occur as a result of widening the L-5 Borrow Canal along the south side of the Holey Land and from STA-3/4 to U.S. 27. Impacts to wetlands and jurisdictional areas can be quantified as follows:

- Disjunct Area 1 (Multi-Turf Pump Station): Construction of the East Perimeter Levee and seepage canal will only slightly affect this area. The existing pump station will be removed and a small portion of the existing canal west of pump station (100 to 150 feet) will be backfilled and crossed by the levee. The remainder of the canal upstream of the levee will not be backfilled and will be incorporated into Cell 1A of the STA. The discharge basin downstream of the pump station will be left in-place and will be part of the seepage canal system. The existing canal south the station will be widened during construction of the seepage canal. Impacts to jurisdictional areas are less than 1 acre.
- Disjunct Area 2 (Multi-Turf/Okeelanta Pump Station: Construction of the East Perimeter Levee will impact a large portion of this area. The discharge basin and a portion of the canal west of the pump station will be backfilled for levee construction. The remaining portion of the canal will be left intact and will be incorporated into the STA. Impacts to jurisdictional areas are estimated to be less than 0.5 acres.
- Disjunct Area 3 (Supply and Miami Canal Intersection): Construction of the inflow canal to station G-372 will impact those jurisdictional areas located north of the Holey Land levee. These areas will be backfilled during construction. No impacts will occur to jurisdictional areas inside the Holey Land. Impacts are estimated to be less than 0.5 acres.
- WCA-3A (west of STA-3/4): The existing L-5 Borrow Canal will be expanded along the entire length of the Holey Land in order to convey STA discharges to pump station S-8. The canal will be expanded to the south and excavated material will be placed within the District's ROW, but south of the existing levee on land that may be considered jurisdictional. The area to be filled is 90 feet wide and 45,000 feet long and totals nearly 90 acres.

- WCA-3A (east of STA-3/4): The existing L-5 Borrow Canal will be expanded from the east side of the STA to U.S. 27 in order to convey STA discharges to pump station S-7. A portion of the material excavated from the canal will be placed within the District's ROW, but south of the existing levee on land that may be considered jurisdictional. The area to be filled is 10 feet wide and 1700' long and totals only 0.4 acres.

The designs as described in this PFD minimize the impacts to State of Florida jurisdictional surface waters and wetlands to the maximum extent practicable, consistent with the needs and function of the Everglades Construction Project. Impacts considered included both direct alterations to jurisdictional surface waters, wetlands and other project related activities which may adversely impact an on-site or an adjacent off-site jurisdictional surface waters or wetlands. In regards to the latter, the project has been modified to eliminate directed discharges to WCA-3A until such time as final phosphorous concentration requirements can be met.